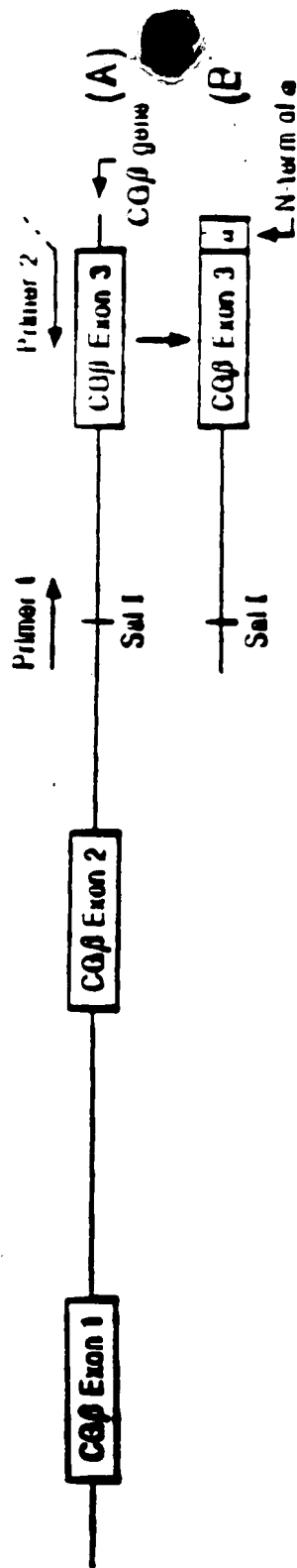
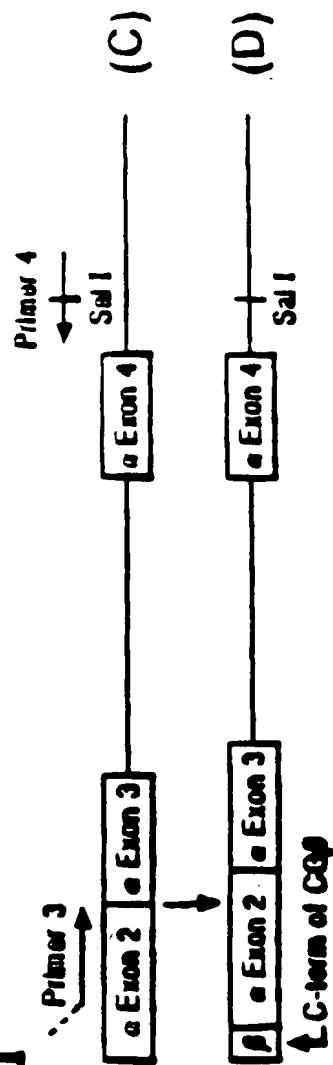


### Reaction I



### Reaction II



### Reaction III

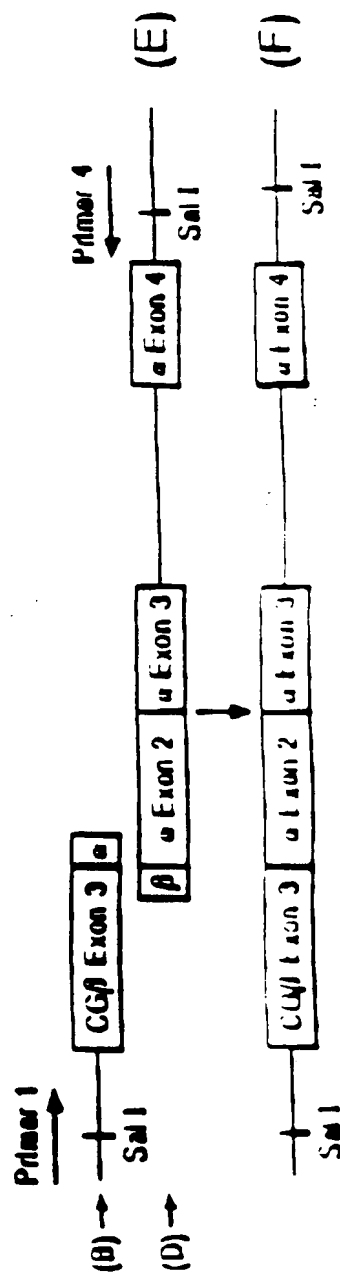


Figure 1

(hCG $\beta$ -WT)

118 120 130

SerSerSerSerLysAlaProProProSerLeuProSerProSerArgLeuProGlyProSer

140 145

AspThrProIleLeuProGln

## Figure 2

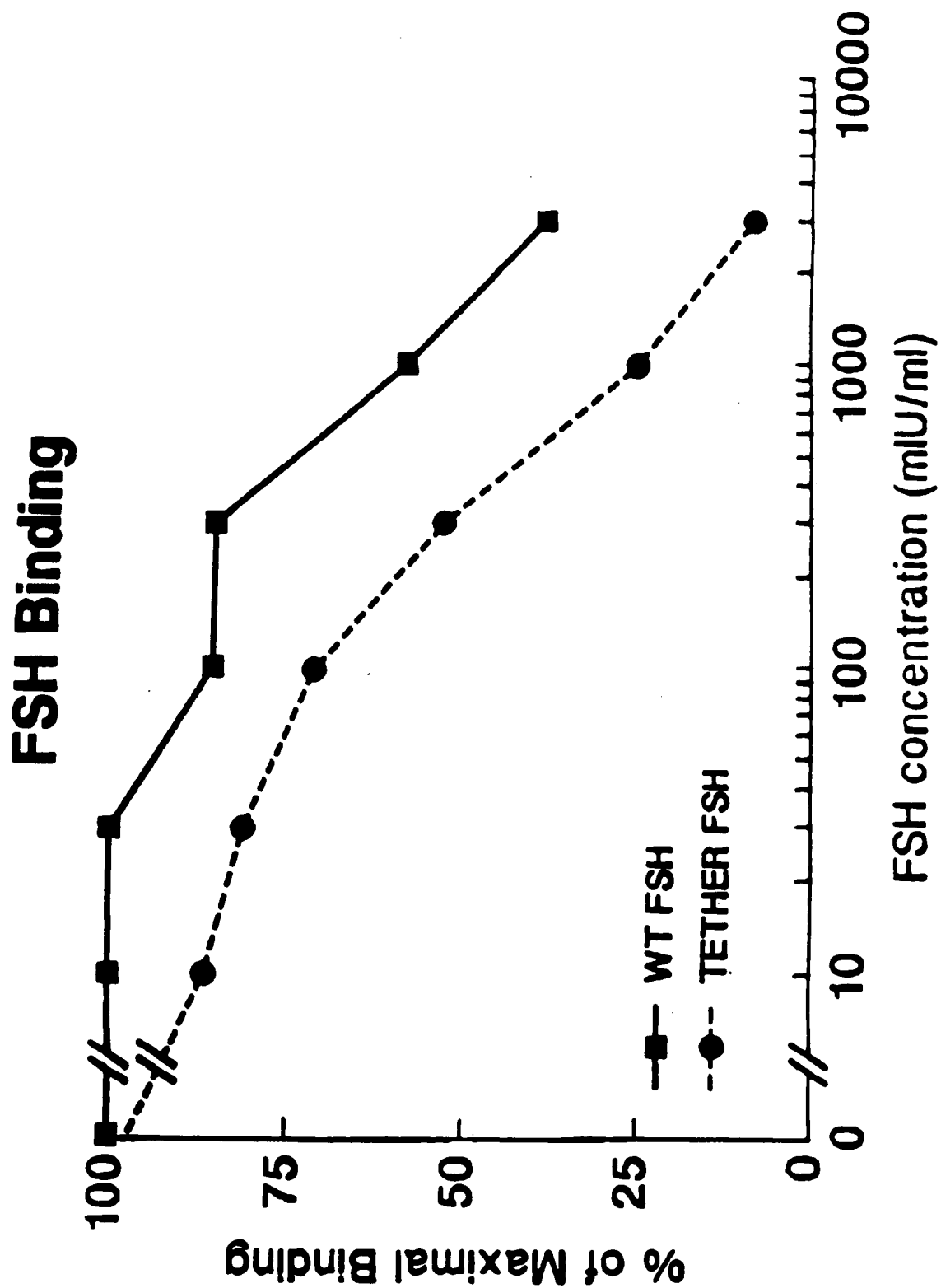


FIGURE 3

# **cAMP Production**

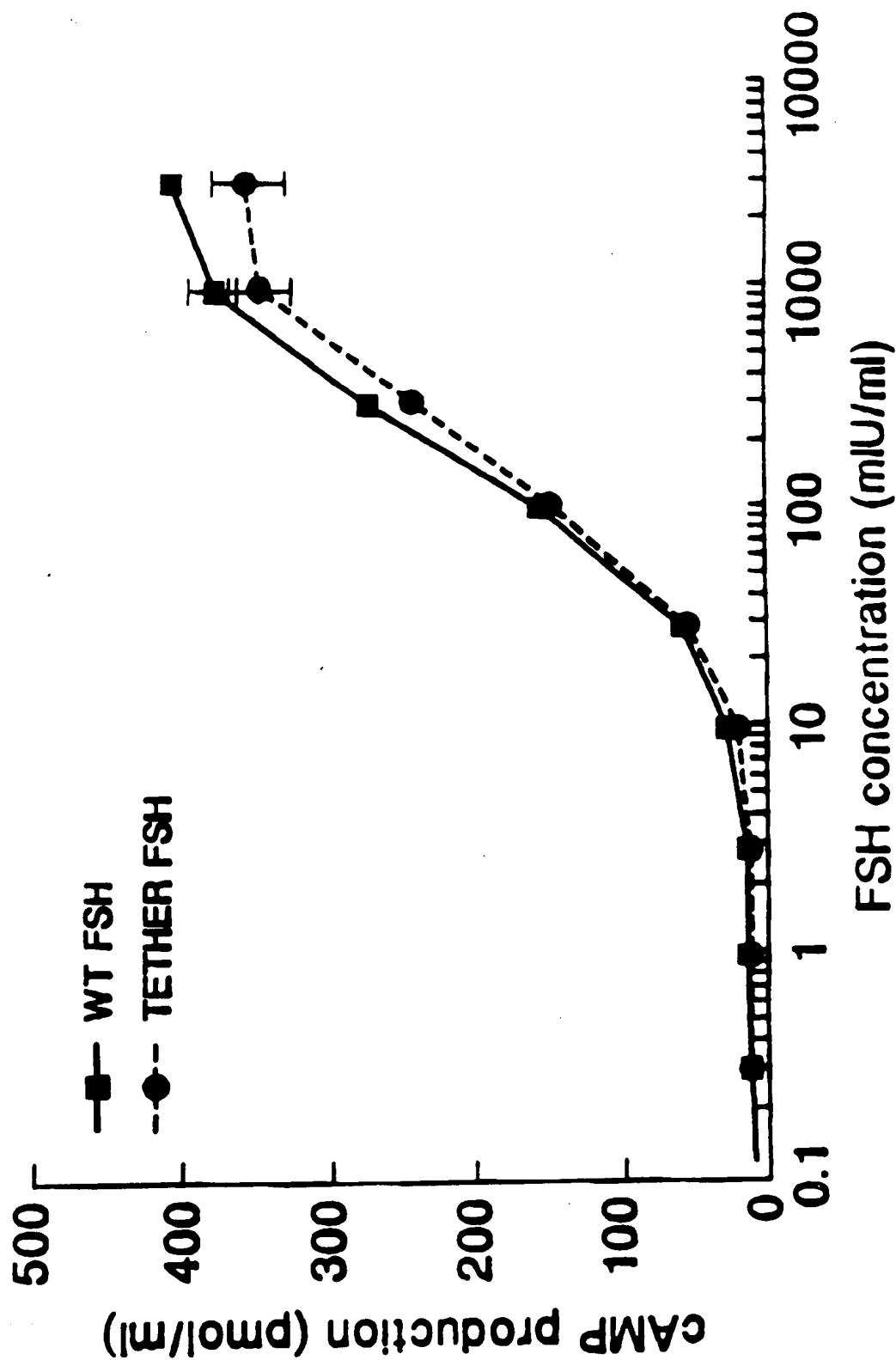


FIGURE 4

**Coding Sequence for Single Chain Gonadotropin Analog #1 and Primers (underlined)**

5'-ATGAATCGAGCGAATTAAGTCTGAGCGCAAGGATGGAGGATGTTCCAGGGGCTGCTCTGTCTGCTGAGCATGGCGGAGCATCGGCATCCCAAGGAGCGCTT-  
ctcaga (XhoI)

R P R C R P I N A T L A V E K E G C P V C I T V M T T I C A G V C P T M T  
CGGGCAGGATGCGCGCCCATCATGCAACCTTGAGTGTGAGAGAGAGGGGTGCCCGTGTGATCGACGTCAACACACCACTGTGCGGGTATGTCGCCCATGACC-  
GCCGGTCCGACCGCGGGGTAGTACGGTGGGACCGGACACCTCTCTCCGACCGGGGACACGTAGTGGCAGTGTGGTGGACACACGCCGATGACGGGGTGGATCTGG-
  
R V L Q G V L R A L P Q V V C M Y R D V R F E S I R L P G C P R G V M P V  
CGGTGCTGAGAGGGGTCTGTGCGCCCTGCTCGAGTGGTGTGCAACTACCGCATGCGGTGTCCAGTCCATCGGGTTCCTGGGTGCCCGCGGGGTGAGCCCGTG-  
GGGACGAGGTCCCCGACGAGCGCGGAGCGAGGTCCACCGAGTGTATGGCGGTACACCGCAGCTCAGTAGGCCGAGGACGACGAGGGTGGCGCCGACTTGGGGACAC-  
cctnaga(Mut11)

V S Y A V A L S C O C A L C R R S T T D C G G P K D H P L Y C O D P R F Q  
GTCTCTACGCCGTGCTCAGCTGTCATGTGACTTCGCCGCCGACGACCATGACTGGGGGGTCCGACGACCACTTCACCTGTGATGATCCCCGCTTCCAG-  
CAGAGGATGCGCACCGCAGTCGADAGTACAGTGACGACGCGGGCGTGTGATGATGACGCGCCCCCAGGGTCTCTGGTGGGGACCTGGAAGTCTCTGGGGGCAAGTCTC-

D S S S K A P P S L P S P S R L P G P S D T P I L P Q G S G S G S  
GACTCTCTCTCTCAAGGCCCTCCCCGAGCTTCCAGGCCATCCGACTCCGGGGCCCTCGACACCCGATCTCTCCCAAGGATCGGTAGCGGATCTGGTAGC-  
CTGAGGAGAGAGAGATTTCGGGGAGGGGGGTCGGCAAGTTCGGGTAGGGCTGAGGGGCCCGGGAGCTGTGGGGTAGGAGGGGGTTCTTAGGCGATCGGCTAGGACATCG-

A P D V Q D C P E C T L Q E N P F S Q P G A P I L Q C M G C C F S R A Y  
GGTCTGATGTCAGGAATGGCCAGATGCACGGCTACAGAAACCCATCTCTCCACGCGGGTCCCAATACTCAGTCGATGGCGTGTCTTCTACAGCATAT-  
CGAAGNATACACAGTCTTAACGGGTCTACGTGCGATGCTCTTTGGGTAAAGAGGGTCCGGCCACGGGGTTAGAGTCAGCTACCCGACGACGAAGAGATCTCGTATA-  
gcct(Eco47III)

P P T P L R S K K T M L V Q K N V T S E S T C C V A K S Y M R V T V M G G F  
CCCACTCCACTCAGGTCCAAAGACGATGTGGTCCAAAGACGTCCTCAGAGTCCACTGCTGTGTAGCTAAATCATATAACAGGTCACAGTAATGGGGGGTTTC-  
GGGTAGGTGATCCAGGTCTTCTGCTACACACGAGTTTCTTCAGTGGAGTCTCAGGTGCACGACATCGATTAGTATATTGTCCAGTGTGATTACCTCCCAAG-

K V E N H T A C H C S T C Y Y H K S \*

AAAGTGGAGAACACACGGGGTGGCACTCGAGTACTGTATTAATCAGAAATCTTAAGGTACC-3'

TTTACCCTCTGGTGTGGCCGACGGTGACGTCAATGAACAAATAATAGTGTATAGAAATCCATGGCCTAGGTAGAGTTCGATTAGGCTT-5'

(KpnI)gggaccggatcc(BglII)

**Coding Sequence for Single Chain Gonadotropin Analog #2 and Primers (underlined),**

[illegible]

R P R C R P I N A T L A V E K E G C P V C I T T V M T T I C A G V C P T M T  
CGGGACAGGTGGCGGCCCATGCATGCAACCTTGGGTGTGGACAGAGGGGTGCCCGTGTGCATCAGCTCAACACCACTCTGTGCCGGCTACTGCCCCACCATGACC-  
GCCGGTCCCAACGCGGGGTAGTTACGGTGGGACCGACCATCTCTCTCCGAGCGGGGCACACGTAGTGGCAGTTGTGGTGGACACACGCCGCATGACGGGGTGGATCTGG-  
  
R V L Q G V L R A L P Q V V C M Y R D V R F E S I R L P G C P R G V M P V  
CGCGTGTGTGAGAGGGGTCTGCCGGGCTTGCTCAGATGGTGTGCAACTACCGCATGTGCGCTTTCGAGTCCATCCGGCTCCCTGGCTGCCCGCGGGCTGACACCCCGTG-  
GGCAGACGACTCCCGCCAGAGCGGCGGGACCGTCCACCATGGTGTGGCTGTACACCGGAGCTCAGGTAGGTCGAGGGATCGACGGGGCGGCGCCGCACTTGGGGAC-  
  
ccnaga (NstII)

V S Y A V A L S C Q C A L C R R S T Y D C G G P K D M P L Y C D D P R G S  
GTCTCTACGGCGTGCTCTGACGTGTAATGTCACTCTCCGCCGAGACCACTGACTCGGGGTCCCAAGCACCACCTTGCCTGTGATGACCCCGGGGATCC-  
CAGAGGATCGGGACCGACAGTGCACAGTTACAGTGACAGCGGGCGCGTCTGTGACTGACGCCGCCCAAGGATTCTTGTGGGAACTGGACACTACTGGCGGCCCTTAGG-  
(Set1)ccgcgggaat

G S G S G S A P D V Q D C P E C T L Q E N P F F S Q P G A P I L Q C M G C  
GGTAGGGATCTGGTAGGGCTCTGATGTGCAGGATGCCAGGATGCAGCGTACAGAGAAACCCATCTCTCCACGCGGGGTGCCCCAACTACTTCAGTCGATGGCGTCG-  
CCATCGCTTAGACCATCGCAGGACATACAGTCTTACCGGGTCTTACGTGCGATGTCTTTGGGTAGAGAGAGGGTCCGGCCACCGGGGTATGAATCAGTCAGTCACCGGACCG-  
accgct(Eco47III)

C F S R A V P T P L R S K K T M L V Q K N V T S E S T C C V A K S Y M R V

T V M G G F K V E N T A C H C S T C Y V N K S \*

CAGTAATGGGGGTTCAAAGTGGAGACACAGCGTCCAGTACTTGTTATCACCAATCTTAGGTACC-3'

GTGATTACCCCCCAAGTTCACTCTTGGTGTGCCGACGGTGAAGTATAGTGTAGAAATTCATGG-5'

ggtagc(gpn1)

Figure 7

Coding Sequence for Single Chain Gonadotropin Analog #3 and Primers (underlined)

5'-ATGAAATGAGCGAATCAGACTDAGGCGAAGAAIGGAGATGCTCGAGGGCTGGTCTGTTGCTGCTGAGCATGGCGGGGCAATGGGCAATCCAGGGAGCCGCTT-  
 3'-GGTTCCTTACCTCTACGAGGTCGCCGAGCAGACAGCAGCAGACTGCTACCGCCCGCTACCGTAGGTCCCTCGGGGAA-  
 ctgag(MhoI)  
 M E M L Q G L L L L L L S M G G A W A S R E P L  
 R P W C M P I M A I L A V E K E G C P V C I T V M T I C A G Y C P T M M  
 CGGCAATGGTCCACCCCATCAATGCCATCCTGGCTGTGGAGAGAGAGGGTGCCTGCTGATCACCCTCAACACCAACCATCTGTCGGCTACTGCCCCACCATGATC-  
 GCCGATACCACGGTGGGATGTTACGGTAGGACCGACACTCTTCTCCGAGCGGGGACAGCTAGTGGCAGTTGTGGTAGACAGGGCGGATGACGGGGTGGTACTAC-  
 R V L Q A V L P L P Q V V C T Y R D V R F E S I R L P G C P R G V D P V  
 CGGCTGCTGAGAGCGGCTCTGCCCCCTGCTCAGGTGGTGCACCTACCGTGAATGGCTTTCAGTCCATCGGCTCCCTGGCTGCCCGCTGGGTGGAGCCCGTG-  
 GCGACAGCTCCGCCAGAGCGGGCGGAGCGGAGTCCACACACAGTGGATGGACTACAGCGGAGGCTCAGTAGCGCGAGGACGAGCGGCGACCGGACCTGGGGCAC-  
 cctnagg(NatII)  
 V S F P V A L S C R C G P C R S T S D C G G P K D H P L T C D H P Q G S  
 GTCTCTTCCCTGTGGCTCTCAGCTGTGCTGTGACCTTGGCGCGGAGCAGCTCTGACTGTGGGGTCCCAAGACACCCCTTGACCTGTGACCCACCCCAAGATCC-  
 CAGAGGAGGGGACACCGAGTCCAGCGGACACTGGGACGGCGGCTGCTGGAGACTGACACCCCAAGGTTTGTGGGGAGCTGGACACTGGTGGGGTTCCTAGG-  
 (BamHI)ggatcc  
 G S G S G S A P D V Q D C P E C T L Q E M P F F S Q P G A P I L Q C M G C  
 GGTAGCGGATCTGGTACCGCTCTGATGTGCAGGATGCCAGAAATGCAGCTACAGGAAACCCATCTTCTCCAGCGGGTGCCTCAATCTTCAGTGCATGGGTGC-  
 CCATCGCTAGACCATCCGAGGAGTACAGCTCTACCGGCTTACGTGGGATGCTCTTTGGGTAGAGAGAGGGTGGCGCCACGGGGTTATGAAGTCACGTACCGGACG-  
 agcgt(EcoRII)  
 C F S A V P T P L R S K K T M L V Q K M V T S E S T C C V A K S Y N R V  
 TGCTTCTAGAGCAATCCCACTCCACTAAGGTCCAGAGAGAGCATGTTGGTCCAAAGAGAGCTCAGCTCAGAGTCCATCTGCTGTAGCTAAATCATATACAGGGTC-  
 ACAGAGAGATCTGATAGGGTGAAGTGAATCCAGGTTCTCTGTACAGACAGGTTTCTTGTAGTGGAGTCTCAGGTGAACGACACATCGATTTAGTATATGTCCTAG-  
 T V M G G F K V E M H T A C H C S T C Y Y N K S \*  
 ACAGTAATGGGGGTTTCAAGTGGAGAACACAGGGGTGCCACTGCAGTACTTGTTATATCAGAAATCTTAGGTACC-3'  
 TGTCAATTACCCCAAGTTTCACCTCTTGTGTCGCCACAGGTCAGCTCATGACAAATATAGTGTTAGAATTCATGG-5'  
 98tacc(KpnI)

**Coding Sequence for Single Chain Gonadotropin Analog 4 and Primers (underlined)**

5'-ATGAAATCGAGGATCATGACTCGAGCCAGGATGAGGACACTCGAGTCTTTCTGTTCTGGGAAGCAATCTCTGCATAGCTGTGACCTGACCAAC-  
M K T L Q F F F L F C C W K A I C C N S C E L T N  
3'-GATTCTCTCTGTGAGGTCAMAAAGAGGAAGACAGCACTTTCTGTAGAGGACGTTATCGACACTCGACTCGACTGTTG-  
ctcagg(XhoI)

I T I A I E K E E C R F C I S I M T T W C A G Y C Y T R D L V Y K D P A R  
 ATCACCATTGCATAGAGAAGAGATGTCTTCTGCTATAGCATCAACCACTTGTGTGCTACTGCTACACGAGATCTGGTGATATAGGACACCCACGCCACG-  
 TAGTGGTAGCTATCTCTTCTTCTACAGCAAGAGCTAGGCTAGTGTGGTGAACCAACACGACCGATGAGCATGTGCTCCCTAGACCAATATCTTGGGTCGGTCC-  
 P K I Q K T C T F K E L V Y E T V R V P G C A H A D S L Y T Y P V A T Q  
 CCCAAATCCAGAAACATGTACCTTCAGGAATGGTATATGAACAGTGAAGTGCCTGGGTGCTCACCATGCAGATTCCTTGATACATACCCAGTGGCCACCCAG-  
 GGCTTTAGGTCTTTGTACATGGAAGTTCCTTGACCATATCTTGTCACTCTACGGGCGACCAAGTGGTAGCTCTAAGCAACATATGATGGGTCAACCGGTGGGTCT-  
 TGGCA(Ball)

C H C G K C D S T D C T V R G L G P S Y C S F G E M K E G S G S G  
T G T C A C T G G C A A G T G T A C C G A C A C T G A T G T A C T G C C A G C C T G G G C C C A G C T A C T C C T T T G G T G M A T G A A A G A G G A T C C C G T A C C G A T C G G T -  
A C A G T A C A C C G T T C A C A T G T C G T G T G A C T A C A T G A C A C G T C C G A C C C C G G T C G A T G A C A G G A A A C C A C T T T A C T T T C C T A G G C A T C G C C T A G A C C A -  
999ccc (April) 99atccc (Bamb II)

S A P D V Q D C P E C T L Q E N P F F S Q P G A P I L Q C M G C C F S R A  
ACGGTCTGATGTGCAGATTCCTCAGATCAGCATACAGAAACCATTCCTCCACGCGGGTCCCCCATCTCTCAGTCGATCGGCTGCTCTCTAGAGCA-  
TGGCAGACTACAGCTCCTACGGGTTCTACGTGCGATGTCCTTTTGGTAAAGAGGGTGGCCACGAGGGGTATGAAATCAGTACCCGACGACCGAGGATCTCT-  
ggcgct(Eco47111)

V P T P L R S K K T M L V Q K N V T S E S T C C V A K S Y N R V T V M G G  
TATCCCACTCCATAGGTCCAAAGACGATGTTGGTCCAAAGACGTCCACTCAGGTCCACTTGTGTGCTAAATCATATACAGGCTCAGATATGGGGGT-  
ATAGGCTGAGGTGATTCACAGGTCTCTGCTCAACACAGGTTTCTTCGAGTGGAGTCTCAGGTGAACGACACATCGGATTAGTATATTGTCGACAGTGTCAATTAACCECCA-

F K V E N H T A C H C S T C Y V N K S \*

TTCAAGTGGAGACCAACGGGGTCCACTGCAGTACTGTATTATCACAAATCTAAGGTACC-3'

AAGTTTCACCTCTTGGTGTGCCGACGGTGAGTCATCAACAAATAGTGTTAGAATTCATGG-5'

ggTccc(KG)





**Coding Sequence for Single Chain Gonadotropin Analog #6 and Primers (underlined)**

[illegible]

Figure 11

**Coding Sequence for Single Chain Gonadotropin Analog #7 and Primers (underlined)**

[illegible]

R P R C R P I N A T L A V E K E G C P V C I T V M T T I C A G Y C P T M T  
 C G G G C A C G G T G C C C C C A T C A A T G C A C C T T G C T G T G G A C A G A G G G C T G C C C G T G C A T C A C C T C A A C A C C A C T C T G T C C C G G C T A C T G C C C C A C C A T G A C C  
 G C C G G T G C C A C C G C G G G G T A G T T A C G T G G G A C C G A C A C T C T T C C T C C C A C G G G G C A C A C T A G T G G C A G T T G T G G T A G A C A C G C C C A T G A C G G G A T G A T C T G G  
 R V L Q G G V L R A L P Q V V C M Y R D V R F E S I R L P G C P C R G V M P V  
 C G C G T G T G C A G A G G G A T T C G C G G C C T C G T C A G A T G T G T G C A A C T A C C G C G A T G T G C C T T C C A G T C A T C C G G C T C C T T G C T G C C C G C G G G C T G A A C C C G T G  
 G G C A C A C A C T C C C C C A G A C G C G G A C C G A T C C A C C A C A C T G A T G G C G T A C A C G G A G C T A G A T A G G C G A G G A C G A C G G G C G C G C C G A C T T G G G G C A C  
 cctnaga (NstII)

V S Y A V A L S C Q C A L C R R S T T D C T V R G L G P S Y C S F G E G S  
GTCTCTACGGCGTGCTCTACGTGTCAATGTGACTCTCCGCCGACACCACTGACTGCACGTCCGACGGCTGGGCCCACTACTCTCTTTGGTGAAGATCC-  
CAGAGGATCGCCGACCGACAGTCGACAGTTACAGGTGACAGCGGGGGTGTGTGACTGAGTGTGACAGCTTCGGACATCCCGGTCGATGACGAGGGAACCACTCTCTAGG-  
ggggccc(Apal) gpatccc(B)

G S G S G S A P D V Q D C P E C T L Q E N P F F S S Q P G A P I L Q C M G C  
GGTACGGATCTGTAGCGCTCTGATGTGAGATGTCACAGTACGACGACGAGGATCTCTGCCACGCGGGTGCCTCACTCTGATCGGTGC-  
CATCGCTAGACCATCGCAGGACTACAGTCTTACGGGTCTTACGTGCGATGCTCTTTGGATGAAGCAGGGTGGGCGCCAGGGGTTATGAATGATCATACCCGACG-  
agcgcct(Eco47111)

C F S R A A Y P T P L R S K K T M L V Q K N V T S E S T C C V A K S Y M R V  
 -GGTCTCTAGAGCATATCCCACTCACTAAGTCCAGAGAGCGATGTGGTCAMAGAGCTCACTCAGAGTCCACTTGTGTAGCTAAATCATATACAGAGGTC-  
 ACCGAGAGATCGTATAGGGTAGGTGATTCAGGTGCTTCTGCTACACCAAGGTTTCTTGCAGTGGAGTCTCAAGTGAACGACACATCGATTAGTATATGTCCGAG-  
  
 T V M G G G F K V E N H T A C H C S T C Y V M K S \*  
 ACAGTAATGGGGGGTTTCAAGTGGAGAACCAACGGGCTGCACCTGCAGTACTGTGTATTATCACAAATCTTAGGTACC-3'  
 TGTCAATACGCCCAAGATTTCACTCTTGGTGTGGCCGACGGTGACGTCAATCAATATAGTGTGTAGGATTCATGG-5'  
 99Tacc(Kpm1)

Figure 12

Coding Sequence for Single Chain Gonadotropin Analog #8 and Primers (underlined):

5'-ATGAAATGACGGAAATCAGACTGAGGCCAGGATGGAGATGTTCGAGGGGTGTGCTGTGCTGCTGCTGAGCATGGGCGGACATGGGCATCCAGGAGCGCGTT-  
 3'-GATTCTCTACTCTTACAGGTCCCGACGACGACGACGACGACTCGTACCGCCCTGTACCCGTAGGTTCTCTGGCGAA-  
 ctgagg(NotI)

M E M F Q G L L L L L S M G G T W A S K E P L

R P R C R P I N A T L A V E K E G C P V C I T V N T T I C A G Y C P T M T  
 CGGCCACGGTGCCECCCATCAATGCACCTGGCTGTGGAGAGGAGGGGTGCCCGTGTGCATCAGCGTCACACACCACTCTGTGCGGCTACTGCCCCACCATGACC-  
 GCGCGTGCACCGCGCGGGTAGTTACGGTGGGACGACACTCTTCTCCGAGCGGGCACAGTAGTGGCAGTTGTGGTAGACACAGCGCCGATGACGGGGTGGATCTGG-

R V L Q G V L R A L P Q V V C M Y R D V R F E S I R L P G C P R G V M P V  
 CGCGTGTGCAGGGGGTCTTGCCGGCTCTGCTCAGTGTGTGCACTACCGCATGTGCGGTTCGAGTCCATCGGGTCCCTGGCTGCCCGCGGGGTGAACCCCGTG-  
 GCGACGACGTCCCGAGGACGGCGGGAGGAGTCCACGACGTTGATGGCGGTACACGGGAGCTCAGTAGGCGGAGGACGACGGGCGCGGCTTGGGCGAC-  
 cctnag(NotII)

V S Y A V A L S C Q C A L C R R S T T D C T V R G L G P S Y C D D P R G S  
 GTCTCTACGCGGTGGCTCTEAGCTGTCAATGTGCACCTGCCCGCGGACGACCACTGACTGCACGTGCCAGGCTTGGGCGCCAGCTACTGCCATGACCCCGGGGATCC-  
 CAGAGGATGGGCGACCGACAGTCCACAGTTACAGTGAAGCGGGGTGGTGGTGAAGTGGAGCTGGAGCGGCTGGAGCTACTGGGCGGCTTAGG-  
 999ccc(ApaI) (SstI)ccg-999gattccc(BamHI)

G S G S G S A P D V Q D C P E C T L Q E N P F F S Q P G A P I L Q C M G C  
 GGTAGCGGATCTGGTAGCGCTCTGTGATGTGCAGGATTGCACCAAGTACAGGCTACAGGAAACCACTTCTTCCAGCGGGGTGCCCAATACTTCAGTGCATGGGCTGC-  
 CCACTGCTTAGACCATCGCGAGGACTACAGCTCTACGGGCTTAGCTGCATGTCTTTGGGTAGAGAGAGGGTGGGCGCCAGGGGTATGAAAGTCAGTCACCGGACG-  
 agcgc(Eco47III)

C F S R A Y P T P L R S K K T M L V Q K N V T S E S T C C V A K S Y N R V  
 TGTCTCTAGAGCATATCCCACTCCACTCCAGTGGTCCAGAGAGCGATGTGTGTCMAAGAGCGTCACCTCAGAGTCCACTTGTGTGTAGCTAAATCATATACAGGGTC-  
 ACGAGAGATCTGTATAGGGTGAAGTATCCAGGTTCTCTGTACACCAAGGTTTCTTCCAGTGGAGTCTCAGGTGAACGACACATCGATTAGTATATATGTCACG-

T V M G G F K V E N H T A C N C S T C Y Y H K S •

ACAGTAATGGGGGTTTCAAGTGGAGACACAGCGGTGCCACTGCCAGTACTGTATATACCAATCTTAAGGTACC-3'  
 TGTCAATTACCCCGGAAAGTTTCACCTCTTGGTGGCGGACCGGTGACGTGATGACCAATAATAGTGTTAGAATTCCATGG-5'

99tacc(KpnI)

**Coding Sequence for Single Chain Gonadotropin Analog 9 and Cassette (underlined)**

[illegible]

I T I A I E K E E C R F C I S I M T V W C A G Y C Y T R D L V Y K D P A R  
 ATCACCATTGCATAGAGAAGAAGATGCTTTCTGCATATGCAATCAACCACTTGGTGTGCTGGTACTGCTACACAGGAGTCTGGTGATATAGGACATCCAGCCAGG-  
 TAGTGGTAACTGATCTCTCTTCTTACAGCAAGACGTAGGCTAGTGTGGTGAACACACAGCCGATGACGATGGTCCCTAGACCAACATATCTTGGATCGGTC-  
 P K I Q K T C T F K E L V Y E T V R V P G C A H N A D S L Y T V T V P V A T Q  
 CCCAAATCAGAAACATGTACCTTCACGGAACCTGGTATATGAACAGTGAAGTGCCTGGTCTGCTACCATGGAGATCTCTGTATACATACCCAGTGGCACCACCG-  
 GAGTTTATAGGTCCTTTGACATGGAAGTTCCTTGACCATATATCTTGTCACTCTCAGGGGCGACAGAGTGGTACGCTATAGGAACAATATGTATGGGTACCCGGTGGGTCT-  
 TGGCCA (8a11)

C H C G K C D S T D C T V R G L G P S Y C S F G E G S G S G S A P  
TGTACTGTGGCAAGTGTACACGACGACACTGATTGTACTGTCCAGGCTTGGGGCCCACTTCTCTTTGGTGAAGACTCCGGTAGCGGATCTGGTAGCGCTCT-  
ACAGTGCACCGCTTTCACACTGTGCTGTGTGACTACATGACAGCTTCGAGCCCTGGATCGATGACGAGGAACACTCTCTTAGCCCATCGCTTAGCATTACCGGAGA-  
ggggccc(Apal) (BamHI)ggagctcc agcctt(EcoRV)ttttt

D V Q D C P E C T L Q E N P F S Q P G A P I L Q C M G C C F S R A Y P I  
GATGTGAGGATTCGCAGATGCAACCTACAGAAACCAATTCCTCCAGCCGGGTGCCCAATCTTCAGTGCATGGGTGCTGCTCTAGAGCAATCCACT-  
CTACACAGCTCTACGGGCTTACGTCCGATGCTCTTGGGTAGAGAGAGGGTGGCCCCAGGGGTTATGAAGTCAGCTACCCGACGACGACGATCTCTGTATAGGGTGA-

P L R S K K T M L V Q K N V T S E S T C C V A K S Y N R V T V M G G F K V  
CCACTAGGTCCAGAGACGATGTTGGTCCAAAGACAGTCACCTCAGAGTCACCTGCTGTGCTAGCTAAATCATATACACGGGTACACAGTAATGGGGGTTCCTAAGTGTG-  
GGTGATTCAGGTTCTTCGTACACACCAAGTTTCTTCGATGGAGTCTCAGGTGAACGACATCGGATTTAGTATATGTGCCAGTGTCATTACCCCAAGTTTCATC-

ENH T A C H C S T C Y Y H K S \*

GAGAACACACGGGTGGCACTGCAGTACTTGTTATTATCACAAATCTTAGGTACC-3'  
CTCTTGGTGGTGGCAGGGTGAAGTCATGAACAAATATAGTGTTAGAATTCATGG-5'

9912 acc (Kpnl)

Figure 14

Coding Sequence for Single Chain Gonadotropin Analog 10 and Cassette (underlined):

5'-ATGAAATCGAGGAATCAGACTCGAGCCAGGATGAAGCACTCCAGTTTTCCTCTTCTGTTCTGTTGGAAGCAATCTGTCATAGCTGTGAGTGAACAC-  
 3'-GATTCTCTACTTCTGTGAGSTCAAAAGAGGAAAGACAGCAACCTTTCTTTAGCAGACGTTATCGACACTCGACTGGTTG-  
 ctgag(NotI)

MTLQFFFLFCCKAKAICCNSELTN  
 IYIAIEKEECRFCSINTWCAGYCYTRDLVYKDPAR  
 ATCCATTGCATAGAGAAAGAAAGATGTGTTTCTTCATAGCATCAACCACTTGGTGTGCTGCTACTGTACACACAGGATCTGTGTATAGGACCCAGCAGG-  
 TAGTGGTAGCTTATCTCTTCTTACAGCAAGAGCTAGGGTAGTTGTGTGACCCAGCAGCCGATGCAATGTGTGCTCCCTAGACCAATATTTCTGGGTGGTCC-  
 PKIQKTC T F K E L V Y E T V R V P G C A N H A D S L Y T Y P V A T Q  
 CCCAAATCCAGAAACATGTACCTTCAGGAAGTGGTATGAACAGTGAAGTGGCCGGCTGTCTCACCATGCAGATTCCTTGATACATACCAGTGGCCACCCAG-  
 GGGTTTAGGCTCTTTGTACATGGAAGTTCCTTGACCATACTTTGTCACTCTCACGGCCGACAGAGTGGTAGCTTAGGAACATATGTATGGTCACCCGTTGGTCTC-  
 tggcca(NotI)

CMCGKCDSDSTIDCTVRGLGPSTYCSGSGSGSAPDVQD  
 TGTCACTGTGGCAAGTGTACAGCAGCACTGATGTGCTGAGGCTGGGGCCAGCTACTGCGGATCCGGTAGCGATCTGGTAGCGCTCTGATGTGAGGAT-  
 ACAGTGACCCGTTCACTGTGCTGTGCTGATACATGACACGCTCCGGAGCCCGGCTGATGAGGCTAGGCGCATCGCTAGACCATCGGAGGACTACAGTCTTA-  
 gggccc(ApaI) (BamHI)ggatcc agcctt(EcoRII)

CPECTLQENPFPSQPGAPILQCMGCSFSA YPTPLRS  
 TGCCAGAAATGACGCTACAGGAAACCAATCTCTCCAGCCGGGTGCCCAATCTCACTGATGGGTGCTGCTCTAGAGCATATCCCACTCCACTAGGTCC-  
 ACCGGCTTACGTGCCATGTCTTTTGGGTAGAGAGGGTGGCCCGCGGGTTATGAAGTCACTACCCGAGCAGAGAGATCTGATAGGGTGAAGTGATTCCAGG-

KKTM LVQKNVTS ESTCVAKSYMRVTVMGGFKVENHT  
 AAGAGACGATGTGGTCCAAAGAGAGCTCACTCAGAGTCCACTTGTGTGTAGCTAAATCATATACAGGGTCAAGTAAATGGGGGTTTCAAGTGGAGAACCAACG-  
 TTCTTCTGTACAAACAGGTTTCTTGTGAGTGGAGTCTCAGGTGAACGACACATCGATTAGTATATTGTCCAGTGTATTACCCCAAGTTTCACCTCTTGTGTGCTC-

ACHCSTCYHNKS\*

GGTGCCACTGCAGTACTTGTATTATCAAAATCTTAGGTACC-3'  
 CGCACGGTGACCTCATGAACATATAGTGTTAGAATTCATGG-5'

ggatcc(EpmI)

Figure 15

Preparation of an alpha-subunit coding region lacking oligosaccharide signal sequences

C G S G S G S A P D V Q D C P E C T L Q E M P F F S Q P G A P I L Q C  
TGGGATCCGGTAGCGATCTGGTAGCGCTCCTGATGTGCAGGATTGCCAGGATGCAGCTACAGGAAGCCCATCTCTCCAGCGGGTGCCCAATCTTCAGTGC-  
ACGCTAGCGCATCGCTAAGCAATCGCGAGGACTACAGCTCTTAAGCGGCTTACGTGCGATGCTTTGGTAGAAGAGGGTGGCCCGGGGTATGAGTCACG-  
(BamHI)ggatcc agcgctt(Eco47III)

M G C C F S R A V P T P L R S K K T M L V Q K Q V T S E S T C C V A K S Y  
ATGGCTGCTGCTTCTTAGAGGATATCCGACTCACTAAGGTCCAGAGGAGGAGTGTGGTCCAGAGGAGTCACTCAGAGTCCACTTGTGTAGCTAATCATAT-  
TACCCGACGACGAGAGATCTGATAGGCTGAGGTGATTCCAGGTTCTCTGTACAGCCAGGTTTTCTGTGAGTGGAGTCTCAGGTGAACGACATCATGATTAGTATA-  
tctaga(XbaI)

N R V T V M G G F K V E Q M T A C H C S T C Y Y H K S \*  
AACAGGTCACAGTAATGGGGGTTTCAAGTGGAGGACACACCGCGTGGCACTGGAGTACTGTATTATACAAATCTTAGGTACC-3'  
TTGTCCAGTGTCAATTACCCCAAGTTTCACCTCGTGTGTGTGCGGACGGTCAGCTCATGAACATAATAGTGTTAGAATTCATGGCCAIG-5'  
ggatcc(KpnI)

Figure 16

Preparation of a beta-subunit coding region lacking an-linked oligosaccharide signal sequences

5'-ATGAAATGACGGAATCAGACTCGAGCCAGGATGGAGATGTCCAGGGGGTGTGCTGTGCTGAGCATGGCGGAGCATGGGCATCCAGGAGCCGCTT-  
 3'-GATTCTACTCTACAGGTCCCGACGACGACAGCAGCACTGTACCCGCTGTACCCGTAAGTTCCTCGCGAA-  
 ctgag(KhoI)

R P R C R P I Q A T L A V E K E G C P V C I T V M T T I C A G V C P T M T  
 CCGCCACGATGCTGCGCCCATCCAGCCACCCCTGGCTGTGGAGAGAGGGGTGGCCCGGTGGATCAGCCGTCAACACCACTGTGCTGGCTACTGCCCCACCATGACC-  
 GCGGTGCCACGCGGGGTAGGTGGATGGGACCGACCTCTCTCCGACGGGACACAGTGTGGCAGTGTGGTGTAGACAGGCGCATCAGCGGGTGGATCTGG-

R V L Q G V L R A L P Q V V C M Y R D V R F E S I R L P G C P R G V M P V  
 CCGTGTCTCAGGGGGTCTCTGCGGCCCTGCTCAGGTGTGTGCACTACCGCATGTGCGCTTCGAGTCCATCGGCTCCCTGGCTGCCCGCGGGGTGACCCCGTG-  
 GCGCCAGCTGCCCGAGGACGGCCGGACGGAGTCCACCAACGTTGATGGCGCTACAGCGGAGCTCAGTAGGCTCAGGGATCCGACGGGCGCGCCGACTTGGGGCAC-  
 cctnagg(NstII)

V S Y A V A L S C Q C A L C R R S T T D C G G P K D M P I T C D D P R F Q  
 GTCTCTACGCGTGGCTCTCAGCTGTCAATGCACTCTGCCCGCGAGCAGCACTGACTGCGGGGGTCCAGAGGACACCCCTTGACTGTGATGACCCCGCTTCCAG-  
 CAGAGATGGCGACCGACAGTCCAGAGTACAGCTGACAGCGGGGCTGTGGTGACTGACGCGCCCGCGGGTTCCTGTGGGGAATGGACACTACTGGGGCGGAGGTC-

D S S S K A P P S L P S P S R L P G S D T P I L P Q G S G S G S  
 GACTCTCTCTCAGAGGGCCCTCCCGCCAGCTTCCAGCCCATCCCGACTCCCGGGGCCCTCGGACACCCCGATCTCTCCCGAAGATCCGGTAGCGATCTGGTAGC-  
 CTGAGGAGAGGAGTTTCCGGGAGGGGGTCCGAGAGTTCGGGTAGGGTGAAGGGCCCTGGAGGGGTTTCTAGGGCCATCGGCTAGACCATCG-  
 ggagcc(ApaI)  
 ggatcc(BamHI) agc

A P D V Q D C P  
 GCTCTGATGTGAGGATGGCCCA  
 CAGGACTACAGTCTTACGGGT  
 gct(Eco47III)



